CLAIMS

We Claim:

1. A real-time optical correlating system, said system comprising: a means for recording a holographic matched filter of an input scene; a means for reconstructing said holographic matched filter; a means for connecting said recording and reconstructing means; a means for creating a Fourier transform of a test scene, said Fourier transform being incident on said reconstructing means; and a means for viewing said holographic matched filter and said Fourier transform together for correlation between said input and test scenes.

2. A real-time optical correlating system as set forth in claim 1, wherein said recording means comprises: a source of original laser beam; a means for providing a reference beam and an object beam from said original laser beam, said object beam having encoded thereon said input scene; a means for encoding said object beam with said input scene; a means for combining said reference and object beams to produce an interference pattern of said input scene, said reference and object beams together forming a first beam angle of a pre-selected magnitude; and a first charge-coupled device (CCD) camera for detecting said interference pattern and, in response thereto, produce corresponding video signals.

3. A real-time optical correlating system as set forth in claim 2, wherein said system further comprises: a first beamsplitter positioned to receive and divide said original laser beam issuing from said source into a first beam portion and a second beam portion.

4. A real-time optical correlating system as set forth in claim 3, wherein said means for providing a reference beam and an object beam comprises a second beamsplitter for dividing said first beam portion.

5. A real-time optical correlating system as set forth in claim 4, wherein said encoding means comprises a first lens combination, said first lens combination being positioned one effective focal length away from said input scene in one direction and one effective focal length away from said first CCD in the opposite direction.

6. A real-time optical correlating system as set forth in claim 5, wherein said reconstructing means comprises a liquid crystal display (LCD) positioned to intercept said second beam portion.

7. A real-time optical correlating system as set forth in claim 6, wherein said connecting means comprises a computer coupled between said first CCD and said LCD, said computer having a framegrabber therein and receiving said video signals from said first CCD and transmitting said signals to said LCD to be imaged thereon as a holographic matched filter of said input scene upon the incidence of said second beam portion on said LCD.

8. A real-time optical correlating system as set forth in claim 7, wherein said means for creating a Fourier transform of a test scene is a second lens combination positioned one effective focal length away from the test scene in one direction and one effective focal length away from said LCD in the opposite direction, said test scene and said second lens combination being aligned to intercept said second beam portion prior to the incidence of said second beam portion on said LCD to create thereon a Fourier transform of said test scene.

9. A real-time optical correlating system as set forth in claim 8, wherein said means for viewing said holographic matched filter and said Fourier transform for correlation between said input and test scenes comprises a second charge-coupled device (CCD) and a third lens combination, said third lens combination being positioned between said LCD and said second CCD, one effective focal length away from either, said second

CCD being adapted to receive said holographic matched filter and said Fourier transform from said LCD and image them together for correlation therebetween.

10. A real-time optical correlating system as set forth in claim 9, wherein said system still further comprises several mirrors located strategically so as to steer said beams along pre-determined paths within said system.

11. A real-time optical correlating system, said system comprising: a means for making and displaying an interference pattern of an input scene; a means for creating a Fourier transform of a test scene; and a means for viewing said interference pattern and said Fourier transform together for correlation between said input and test scenes.

12. A real-time optical correlating system as set forth in claim 11, wherein said making and displaying means comprises: a Mach-Zehnder architecture for providing a reflected beam, a reference beam and an object beam, said reference and object beams subsequently combining to yield said interference pattern of an input scene; a liquid crystal display (LCD) unit coupled to receive said interference pattern, said LCD unit being aligned to be illuminated by said reflected beam and creating a light proportional to said object beam in response to said illumination; and a means for receiving said reflected beam and said proportional light from said LCD and producing therefrom an observable holographic image of the input scene.

13. A real-time optical correlating system as set forth in claim 12, wherein said means for creating a Fourier transform of a test scene comprises a test scene placed in the path of said reflected beam prior to its incidence on said LCD unit and a lens combination, said lens combination being positioned between said LCD unit and said receiving means and one effective focal length away from said LCD unit and said receiving means.

14. A real-time optical correlating system as set forth in claim 13, wherein said reference and object beams, upon combination, form a first angle and said reflected beam and said proportional light form a second angle upon departure from said LCD unit toward said receiving means.

15. A real-time optical correlating system as set forth in claim 14, wherein said receiving means is a charge-coupled device suitable for viewing correlation plane.